

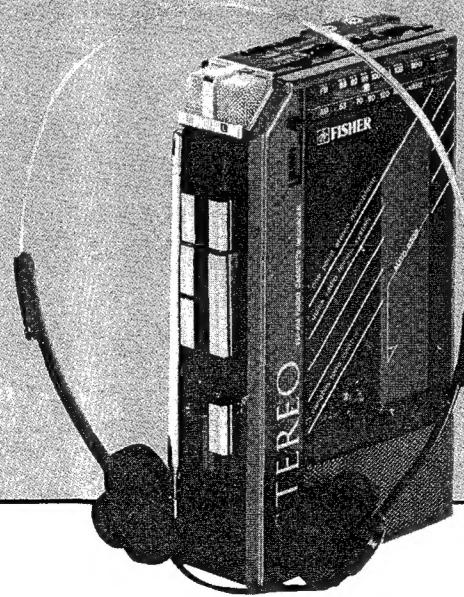
SERVICE MANUAL



FISHER

PH 70

**Mini Stereo Radio Cassette Recorder
(EUROPE)**



THE FIRST NAME IN HIGH FIDELITY

SPECIFICATIONS

Power Source		Frequency Response (Overall)
DC	6V	Fe ₂ O ₃
(HP 7, Mignon Zelle, R 6) x 4		Headphone 40 ~ 10,000Hz
Output Power		Speaker 200 ~ 6,000Hz
Headphone	50mW x 2 (Max.)	Metal
Speaker	700mW (Max.)	Headphone 40 ~ 12,000Hz
Current Consumption (at Vol. Min.)		Speaker 200 ~ 6,000Hz
Record mode	220mA	Erase Ratio (Overall, with Fe ₂ O ₃) more than 50dB
Playback mode	180mA	Signal to Noise Ratio (with Fe ₂ O ₃) more than 40dB
Fast Forward mode	230mA	Crosstalk (with Fe ₂ O ₃)
Rewind mode	260mA	Track to Track more than 55dB
Recording System	AC Bias	Channel Separation (with Fe ₂ O ₃) more than 23dB
Erasing System	Magnet Erasing	Harmonic Distortion (K3, with Fe ₂ O ₃) ... less than 6%
Tape Speed (Normal)	1-7/8ips. ±3%	Hum & Noise
Fast	+20%	(at Vol. Min. with AC Adaptor) -65dBs
Slow	-10%	Terminal Impedance
Fast Forward Time	150sec. (with C-60)	MIC 3.9kΩ
Rewind Time	150sec. (with C-60)	Ext. Speaker 47Ω
Torque		Dimensions (W x H x D) 93(W) x 158(H) x 42.5(D) mm
Playback	35 ~ 55g-cm	Weight 480g
Fast Forward	more than 55g-cm	Frequency Range
Rewind	more than 55g-cm	AM 525 ~ 1,605kHz
Wow & Flutter	0.5%, RMS	FM 88 ~ 108MHz

—Specifications subject to change without notice.—

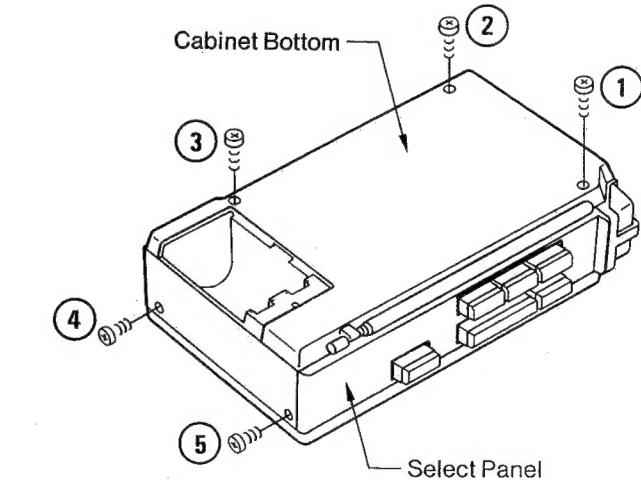
DISASSEMBLY INSTRUCTIONS

GENERAL REMARKS

- Before disassembling the unit, spread a soft rubber mat or a cloth on the work bench to avoid scratches and grease stains.
- Do not use a material which is likely to cause static electricity because transistors and ICs may be easily damaged by it.
- Reassemble the unit, noting the kinds of screws, the soldering and arrangement of the leads. Refer to "Circuit Diagrams and Exploded Views" for correct assembly.
- Before disassembling the unit, take out the cassette tape and the batteries.

CABINET BOTTOM REMOVAL

1. Remove the five screws (1 ~ 5) fastening the Cabinet Bottom and detach the Cabinet Bottom by lifting it.
2. The Select Panel can be removed from the unit by detaching the Cabinet Bottom.

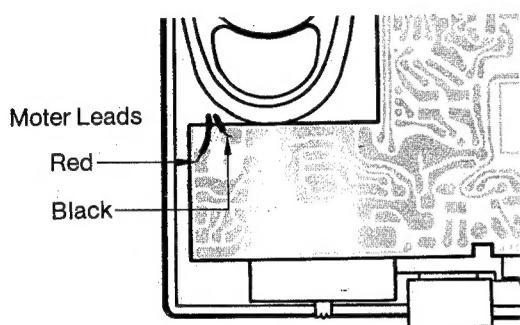
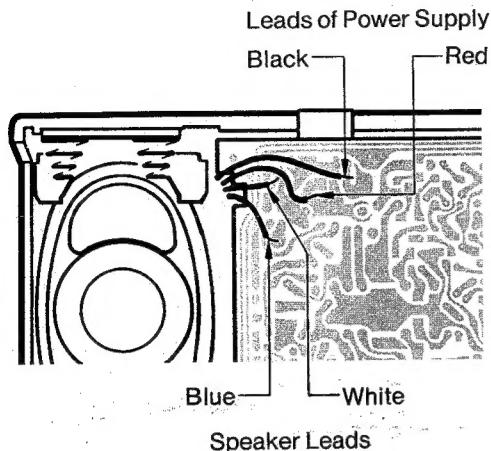


3. Reassemble in reverse order.

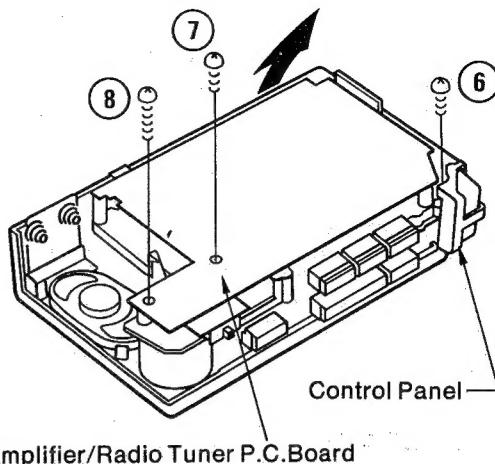
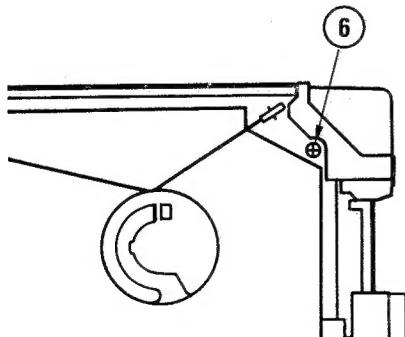
DISASSEMBLY INSTRUCTIONS (Continued)

P.C.BOARD ASSEMBLY REMOVAL

1. Remove the Cabinet Bottom and Select Panel by following the instructions and unsolder the speaker leads (blue and white), the leads of the power supply (black and red) and the motor leads (black and red) from the P.C.Board.



2. Remove the three screws (6 ~ 8) fastening the P.C.Board and detach the P.C.Board by lifting it in the direction of the arrow.



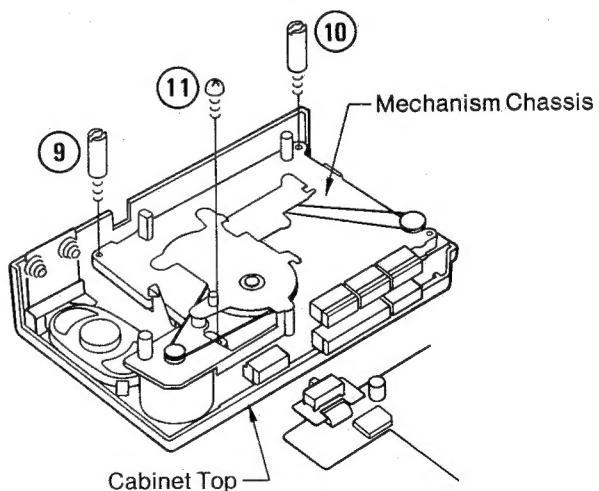
3. Reassemble in reverse order.

NOTE:

When the P.C.Board is mounted on the Mechanism Chassis, set the Switches on the P.C.Board to the Mechanism correctly.

MECHANISM CHASSIS REMOVAL

1. Remove the P.C.Board Assembly by following the instructions.
2. Remove the two posts (9 and 10) and the fastening screw (11) from the Chassis and then, detach the Mechanism Chassis by lifting it from the Cabinet Top.



ADJUSTMENTS

GENERAL REMARKS

- Before adjustment, wipe the tape contacting surfaces clean as well as the contacting surfaces of the driving parts with a soft cloth soaked in alcohol.
Trouble may occur because of oil and grease stains.
- Carefully handle the belt because grease easily attaches to it. Then, check the used rubber parts. If the rubber has deteriorated or is scratched, replace the parts with new ones.

EQUIPMENT REQUIRED

- Cassette-type Torquemeter
- VTVM (2 sets)
- Frequency Counter
- Dualtrace Synchroscope
- DC Constant-voltage Regulator
- Dummy Load (33Ω)
- Test Tapes
 - * 3kHz Test Tape (Example: TEAC MTT-111) for Tape Speed Adjustment
 - * 10kHz Test Tape (Example: TEAC MTT-114) for Head Azimuth Adjustment
- Alignment Tool

Before the Electrical Adjustments, set the Switches as follows:

- * Tape Select Switch NORMAL
- * Function Switch TAPE
- * Pitch Control Switch "N"

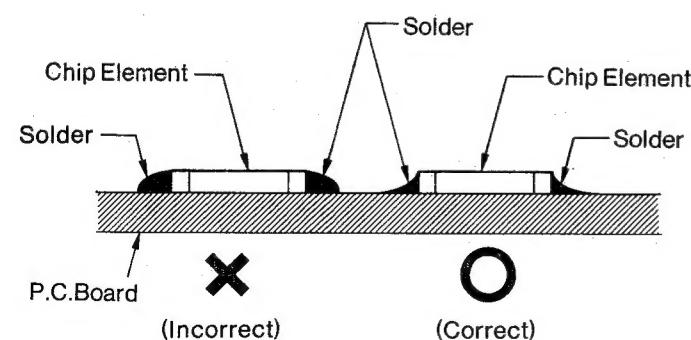
NOTE:

Supply 6.0V DC to the External Power Jack from the constant-voltage regulator at the adjustment.

NOTES ON HANDLING THE CHIP ELEMENT

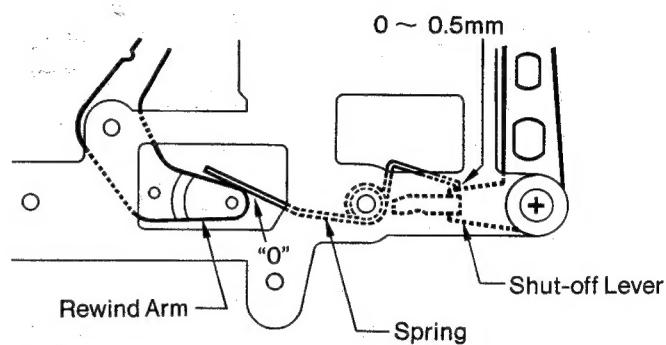
Pay due caution to the following items:

- Do not use the removed chip element again.
- Use a soldering iron of less than 30W.
 - The soldering iron should not touch the body of the chip element.
 - Complete soldering in a short time.
 - Apply solder to the chip element as illustrated below.



AUTO SHUT-OFF MECHANISM ADJUSTMENT

- When the unit is set in the playback mode, the Shut-off Lever reciprocates according to the rotations of the Take-up Idler and Take-up Reel.
- Set the unit in the playback mode with the power supply off and slowly turn the Flywheel clockwise until the Shut-off Lever comes closest to the Spring.
- Check that the Spring touches the Rewind Arm, and that the clearance of $0 \sim 0.5\text{mm}$ remains between the Shut-off Lever and Spring as illustrated.



- If the specified clearance is not obtained, adjust the clearance by bending the Spring.

NOTE:

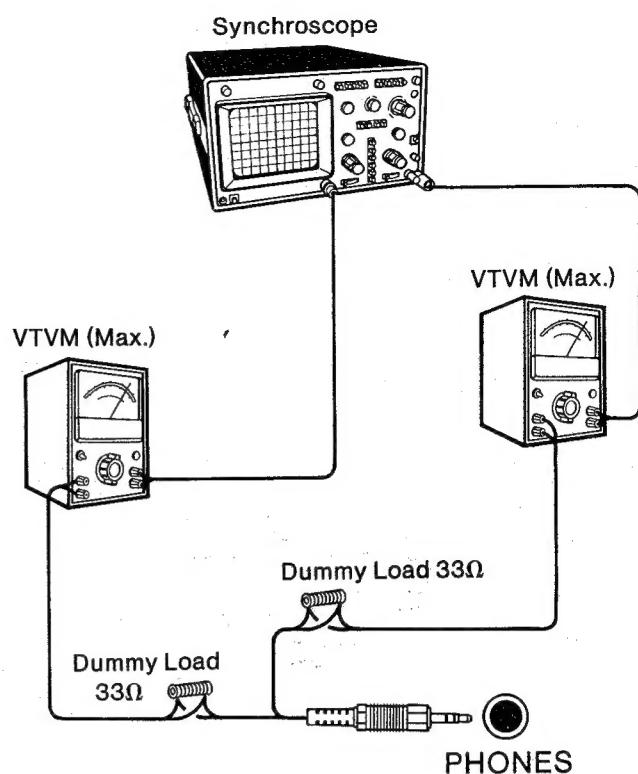
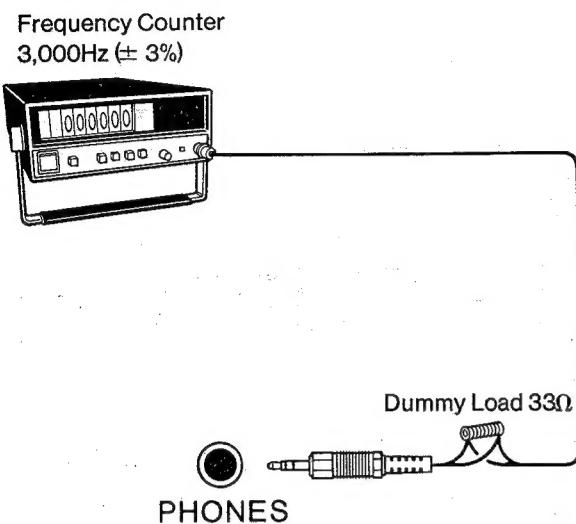
If the clearance is not adjusted correctly, the following symptoms can occur:

- When the clearance is more than 0.6mm :
 - When the Rewind button is released to return the unit from the review mode to the playback mode, the unit may shut off automatically.
- When the Shut-off Lever pushes the Spring while reciprocating:
 - When the tape has reached its end with the unit in the playback mode, the unit may not shut off automatically.

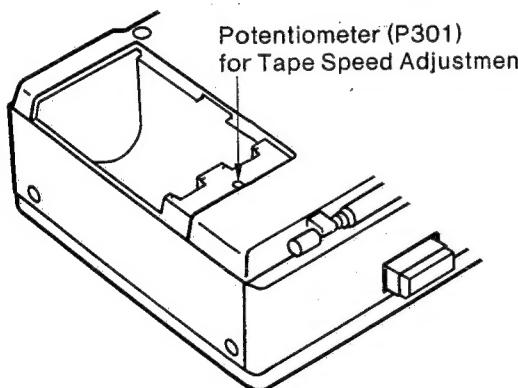
ADJUSTMENTS (Continued)

TAPE SPEED ADJUSTMENT

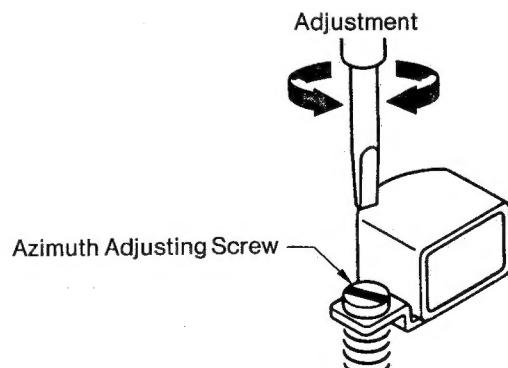
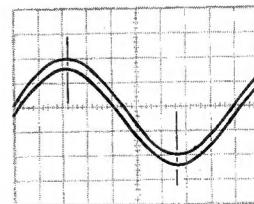
1. Remove the Battery Compartment Lid from the unit and insert a 3kHz test tape (Example: TEAC MTT-111) into the unit.
2. Connect the frequency counter to the headphone jack as illustrated and play back the test tape.



3. While playing back the test tape, adjust the tape speed by turning the potentiometer (P301) on the Amplifier P.C. Board until the frequency counter reads 3kHz ($\pm 3\%$).



2. Insert a 10kHz test tape (Example: TEAC MTT-114) into the unit and play it back.
3. While playing back the test tape, slowly turn the azimuth adjusting screw until the amplitudes of both channel output wave forms become maximum and the wave forms overlap as well as possible in the maximum condition of the VTVM as illustrated.



HEAD AZIMUTH ADJUSTMENT

1. Connect two VTVMs and a synchroscope to the headphone jack as illustrated.

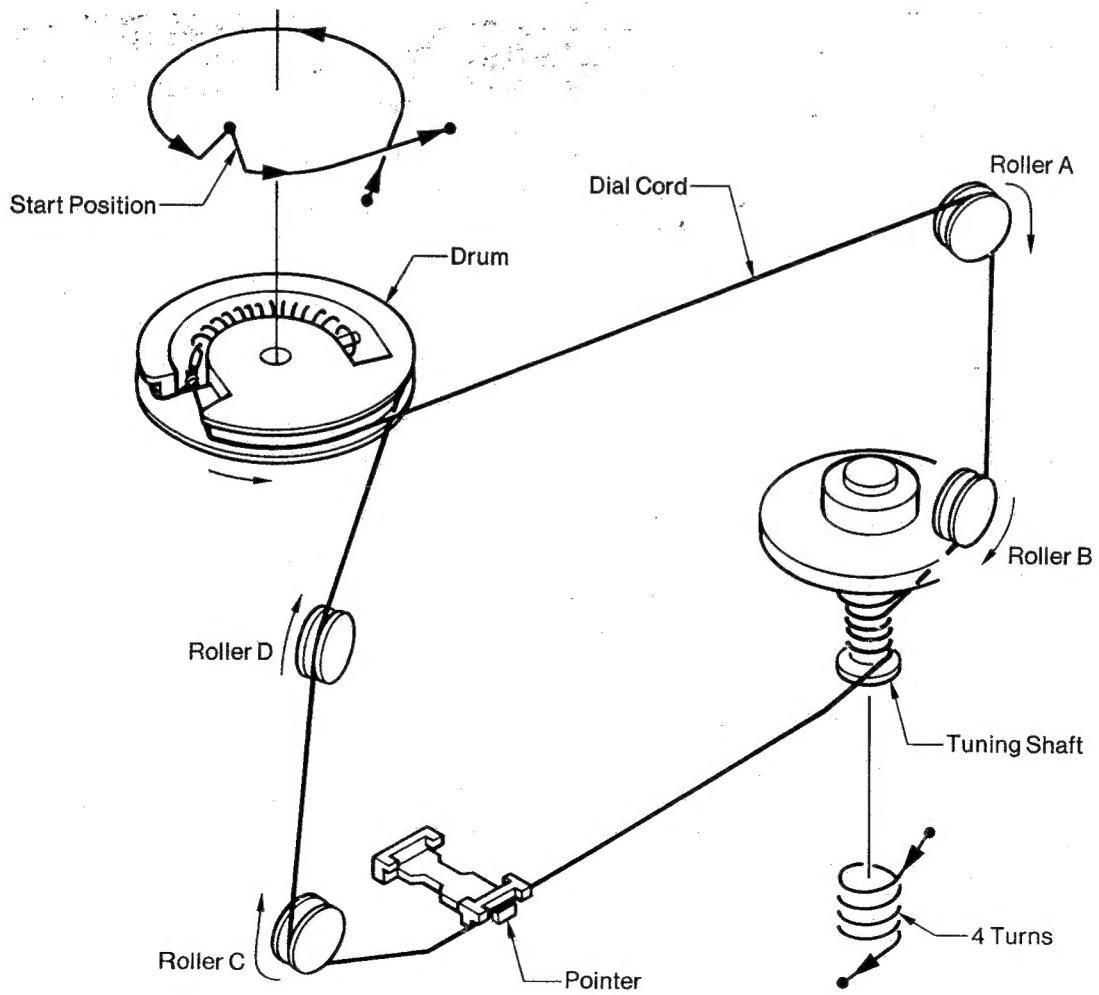
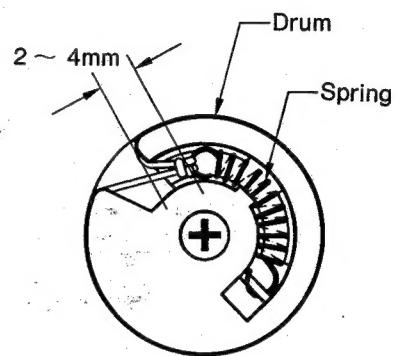
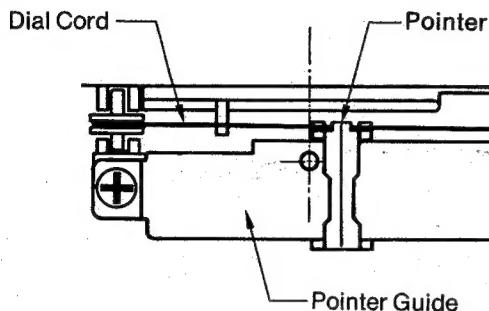
Set the synchroscope as follows:

- * MODE CHOP (chopped)
- * SOURCE INT (internal), CH1 or CH2
- * SWEEP MODE AUTO (automatic)

4. After the adjustment, secure the adjusting screw with paint or glue.

DIAL CORD STRINGING

1. Tie the dial cord of length 700mm and diameter $\phi 0.3$ to the spring and hook the spring to the illustrated position of the drum.
2. Engage the dial cord as illustrated in the following order
Drum → Roller A → Roller B → Tuning Shaft (4 turns) → Roller C → Roller D → Drum → Spring
3. Hook the dial cord to the spring and tie the cord where the end of the spring is positioned 2 ~ 4mm from the illustrated position of the drum.
4. Observing the Tuning Knob from the P.C.Board side, turn it clockwise until it stops.
Then, match the pointer to the mark on the Pointer Guide and attach it to the dial cord as illustrated.
5. Secure the dial cord knot and the pointer with paint or glue in the position.



TUNER ADJUSTMENT

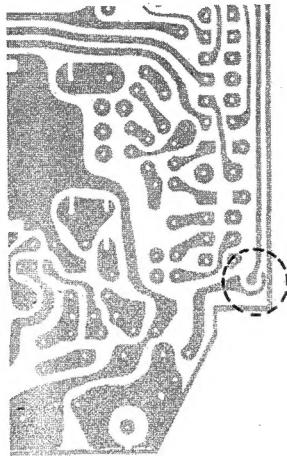
EQUIPMENT REQUIRED

- AM Standard Signal Generator
- FM Standard Signal Generator
- Generator Scope
- Loop Antenna
- Dummy Antenna (75Ω , unbalanced type) for FM
- Ceramic Capacitor (10pF) for FM IF Alignment
- VTVM
- Frequency Counter

- Oscilloscope
- Dummy Load (33Ω)
- Alignment Tool
- Before performing the adjustment, set the switches as follows:
 - * Function Switch RADIO/PLAY
 - * Band Select Switch AM or FM

NOTE:

- * Use an alignment tool with plastic grip for all adjustments.
- * When performing the FM Alignment, open the headphone antenna circuit as illustrated.



AM ALIGNMENT

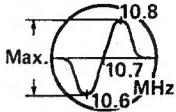
Standard Test Frequency 400Hz and Modulation 30% at AM

Step	Alignment	Connections		Frequency of Signal Generator	Tuning Dial Setting	Adjustments	Remarks
		INPUT	OUTPUT				
1	Calibration of IF for AM	Connect loop antenna to output terminal of gene-scope. Place loop antenna 60cm away from bar antenna.	Connect input terminal of gene-scope to Pin 2 (TP4) in IC3.	460kHz	Low End	T2	Obtain symmetrical curve and maximum amplitude.
2	Calibration of Tuning Range	Connect loop antenna to output terminal of AM signal generator.		510kHz		T4	
3		Place loop antenna 60cm away from bar antenna.	Connect VTVM with 33Ω dummy load and oscilloscope to Headphones jack.	1,670kHz	High End	TC4 (PVC)	Obtain sine-wave of 400Hz and maximum amplitude.
4	Adjustment of Tracking			600kHz	600kHz	L5 (bar ant. coil)	
5				1,400kHz	1,400kHz	TC3 (PVC)	
6	Repeat the above adjustment.						

TUNER ADJUSTMENT (Continued)

FM ALIGNMENT

Standard test frequency 400Hz and deviation 22.5kHz

Step	Alignment	Connections		Frequency of Signal Generator	Tuning Dial Setting	Adjustments	Remarks		
		INPUT	OUTPUT						
1	Calibration of IF	Connect output terminal of gene-scope to Pin 4 (TP3) of IC1 through ceramic capacitor (10pF).	Connect input terminal of gene-scope to Pin 2 (TP4) of IC3.	10.7MHz	Low End	T1 and T3	Obtain S curve and maximum amplitude. 		
2	Calibration of Tuning Range	Connect FM signal generator to antenna terminal (TP1) through dummy antenna (75Ω, unbalanced type).	Connect VTVM with 33Ω dummy load and oscilloscope to Headphones jack.	87.35MHz		L2	Obtain sine-curve and maximum amplitude. 		
3				108.2MHz	High End	TC2 (PVC)			
4	Adjustment of Tracking			90MHz	90MHz	L1			
5				106MHz	106MHz	TC1 (PVC)			
6	Repeat the above adjustment.								

FM MPX (Multiplex) ADJUSTMENT

19kHz (V.C.O.) ADJUSTMENT

Before performing the adjustment, set the unit as follows:

- Function Switch RADIO/PLAY
- Band Select Switch FM ST

1. Connect the frequency counter to the Pin 12 (test point TP8) in IC3 (LA3361).
2. Adjust the potentiometer (P1) until the frequency counter reads 19kHz ($\pm 20\text{Hz}$).

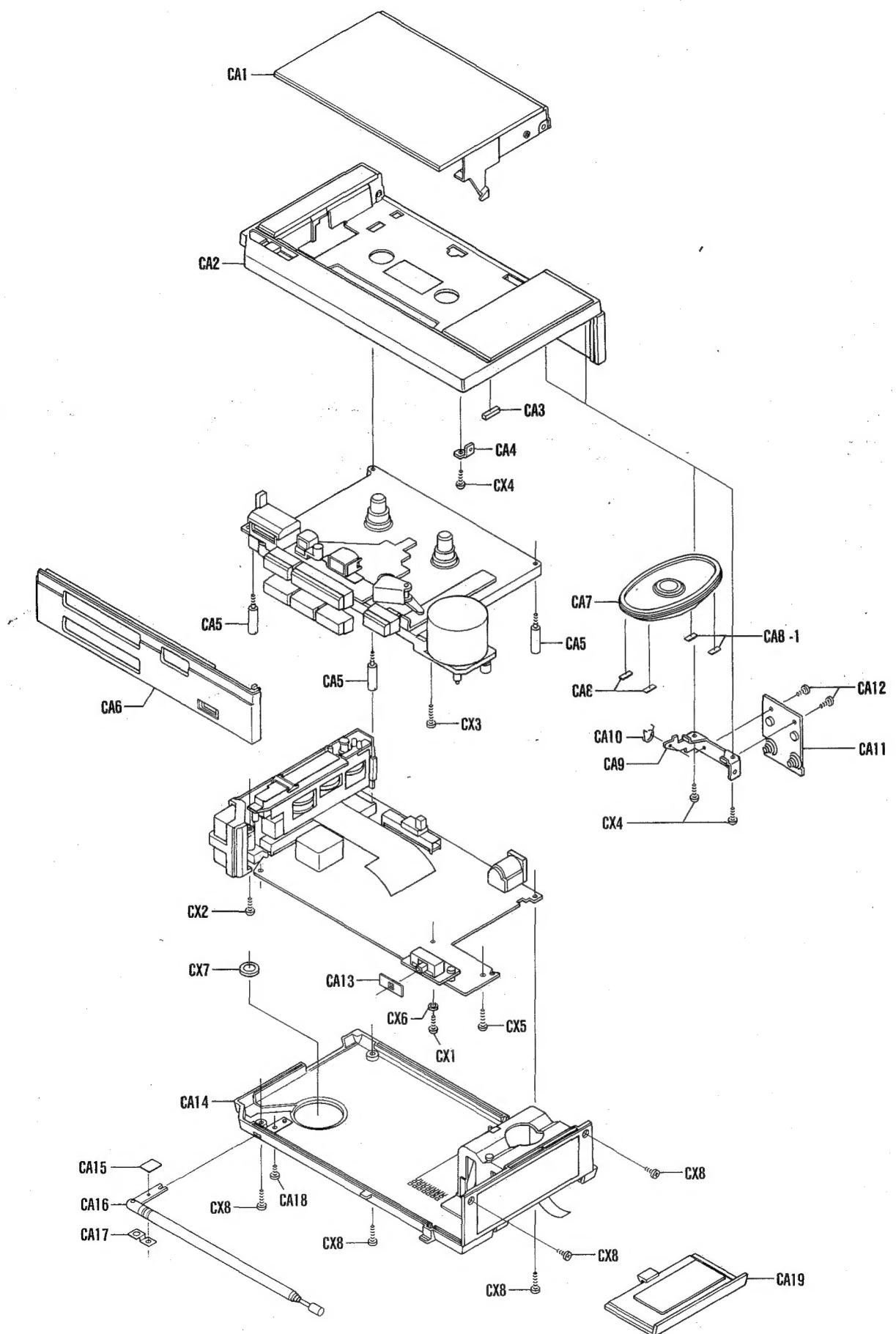
PARTS LIST

Ref. No.	Part No.	Description	Q'ty	Ref. No.	Part No.	Description	Q'ty
PACKAGE							
141 6 1419 67302	Individual Carton		1	DC1	141 2 1149 28801	Control Panel	1
141 6 1449 85400	Case Styrofoam		1	DC2	141 2 4469 42600	Cushion	2
141 6 3919 43100	Pad		1	DC3	4 1539 70780	Microphone Assy [BM1]	1
141 6 2519 12090	Poly Cover		2	DC4	141 2 2449 44400	Net, Mike	1
141 6 4559 03300	Serial No. Sheet		3	DC5	141 2 1559 07200	Grill, Mike	1
ACCESSORIES							
4 1529 70262	Headphones		1	DC6	141 2 1649 17602	Switch Button	2
4 2419 74052	Cassette		1	DC7	141 2 8259 10600	Roller	4
141 6 4519 19400	Warranty Card		1	DC8	141 2 7519 60100	Roller Shaft	1
141 2 1769 07300	Shoulder Strap		1	DC9	141 2 4219 26800	Screw	1
141 2 1769 07401	Hand Strap		1	DC10	141 2 1639 50801	Knob, Volume	1
141 2 1819 14002	Carrying Case		1	DC11	141 2 1639 50701	Knob, Volume	1
142 6 4119 31664	Instruction Manual		1	DC12	4 2229 73404	Volume Control P.C.B. Assy [See PCB2]	1
HEADPHONES							
4 1529 70262	Headphones		1	DC13	141 2 1649 19701	Knob, Switch	1
4 2369 73560	Plug Cord		1	DC14	141 2 8219 32700	Pointer Guide	1
141 2 3529 36700	Tube		2	DC15	141 2 5119 06500	Pointer	1
141 2 4469 41100	Ear Pad		2	DC16	4 2029 70533	LED Indicator P.C.B. Assy [See PCB3]	1
4 1519 71230	Ear Speaker		2	DC17	4 2439 71760	Flexible Printed Circuit	1
141 2 1259 04500	Housing		2	DC18	141 2 1639 50601	Knob, Tone	1
141 2 1769 06304	Hanger, Left		1	DC19	141 2 2719 18400	Pin, Strap	1
141 2 1769 06305	Hanger, Right		1	DC20	141 2 7519 60900	Roller Shaft	3
141 2 8219 32400	Stopper		2	DC21	141 2 7519 60200	Dial Shaft	1
141 2 3529 36800	Slide Adjustor		2	DC22	141 2 1639 50901	Knob, Tuning	1
141 2 1769 06400	Slider		1	DC23	4 2579 71052	Bar Antenna [L5]	1
CABINET							
CA1	141 0 1249 22804	Cassette Lid Assy	1	DC24	141 2 4469 40100	Cushion	1
CA2	141 0 1119 87804	Cabinet Top Assy	1	DC25	4 1329 78219	AMP/Tuner P.C.B. Assy [See PCB1]	1
CA3	141 2 4469 36500	Cushion	1	DC26	141 2 3769 13900	Sheet, Switch	2
CA4	141 2 2149 17900	Bracket	1	DC27	141 2 1539 14600	Spacer, Jack	1
CA5	141 2 7539 23700	Spacer	3	DC27-1	141 2 1539 14601	Spacer, Jack	1
CA6	141 2 1149 28700	Panel, Select	1	DC28	141 2 8429 06400	R/P Switch Lever	1
CA7	4 1519 71360	Speaker (8Ω) [SP1]	1	DC29	141 2 4419 14901	Sheet	1
CA8	141 2 4419 17100	Cushion	2	DC30	4 2319 75651	Switch P.C.B. Assy [See PCB4]	1
CA8-1	141 2 4419 17101	Cushion	2	DC31	141 2 7539 23800	Spacer	2
CA9	141 2 2149 18000	Bracket, Speaker	1	DC32	141 2 5389 03600	Drum	1
CA10	141 2 8519 64500	Spring, Cassette Lid	1	DC33	141 2 8549 14200	Spring	1
CA11	141 0 3829 08800	Terminal Battery Assy	1	DY1	101 3 1302 00811	Screw, Pan Hd.	+M2.0x8
CA12	141 2 4219 09003	Screw	2	DY2	103 3 1302 00611	Screw, Pan Hd. Tapping-2	+M2.0x6
CA13	141 2 2419 27500	Sheet, Knob	1	DY3	106 3 1302 00123	Hex. Nut-3	M2.0
CA14	141 0 1119 87904	Cabinet Bottom Assy	1	DY4	127 3 1317 02514	PI Screw-1, Pan Hd.	+M1.7x2.5
CA15	141 2 4359 21500	Insulator	1	DY5	128 3 1317 03018	PI Screw-3, Pan Hd.	+M1.7x3.0
CA16	4 2449 70320	Rod Antenna	1	DY6	629 3 0907 00000	String, φ0.3	1
CA17	141 2 3829 34400	Antenna Terminal	1				
CA18	141 2 4219 03002	Screw	1				
CA19	141 0 1339 11201	Battery Lid Assy	1				
CX1	101 3 1302 00411	Screw, Pan Hd.	1				
CX2	101 3 1302 00611	Screw, Pan Hd.	1				
CX3	101 3 1302 01011	Screw, Pan Hd.	1				
CX4	103 3 1302 00611	Screw, Pan Hd. Tapping-2	3				
CX5	103 3 1302 01211	Screw, Pan Hd. Tapping-2	1				
CX6	110 3 2102 00081	Spring Washer-2	1				
CX7	110 3 9500 80054	Nylon Washer	1				
CX8	128 3 1320 05018	PI Screw-3, Pan Hd.	5				

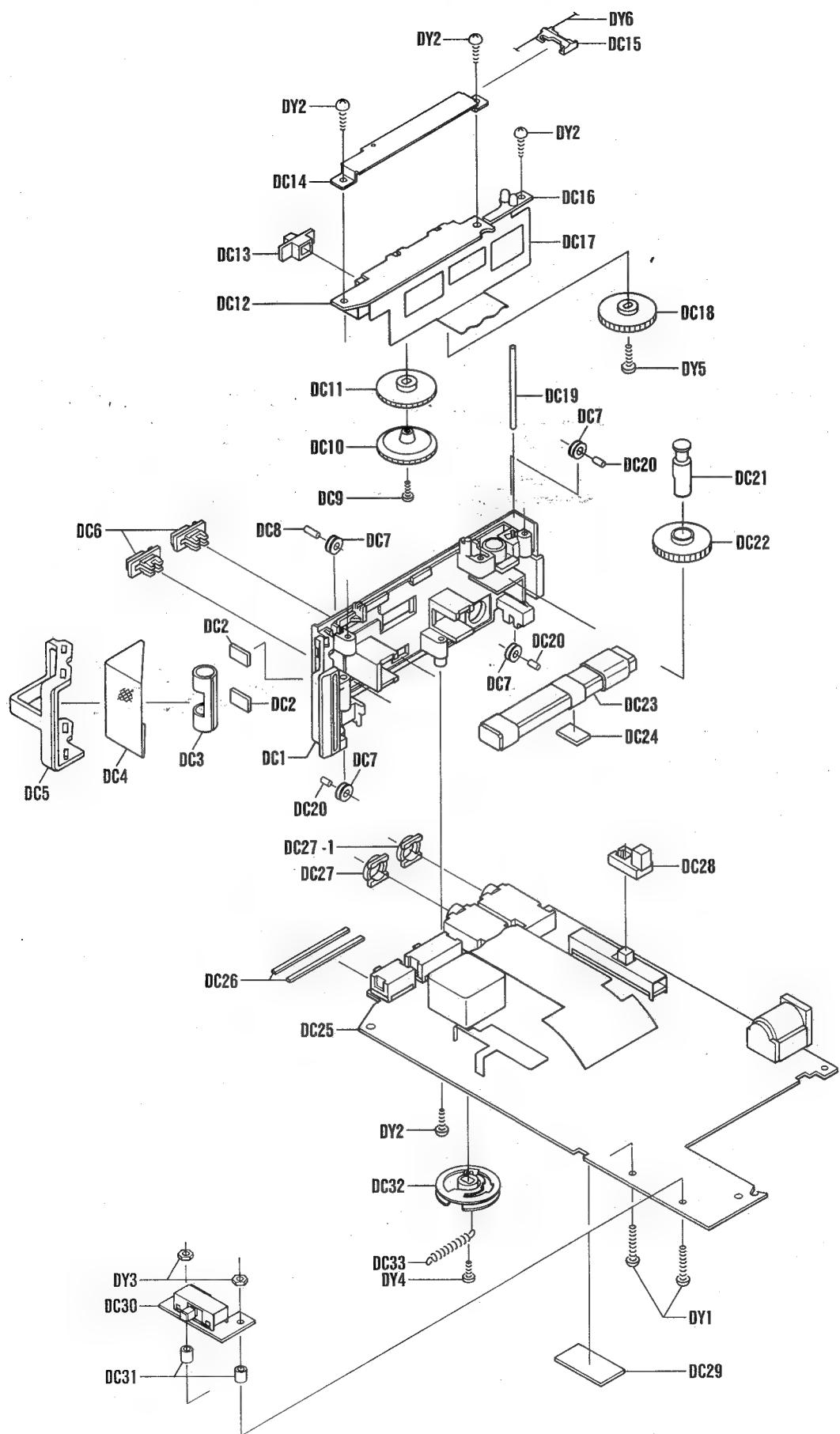
NOTES:

1. Parts order must contain Model Number, Part Number and Description.
2. Ordering quantity of screws and resistors must be multiple of 10 pcs.

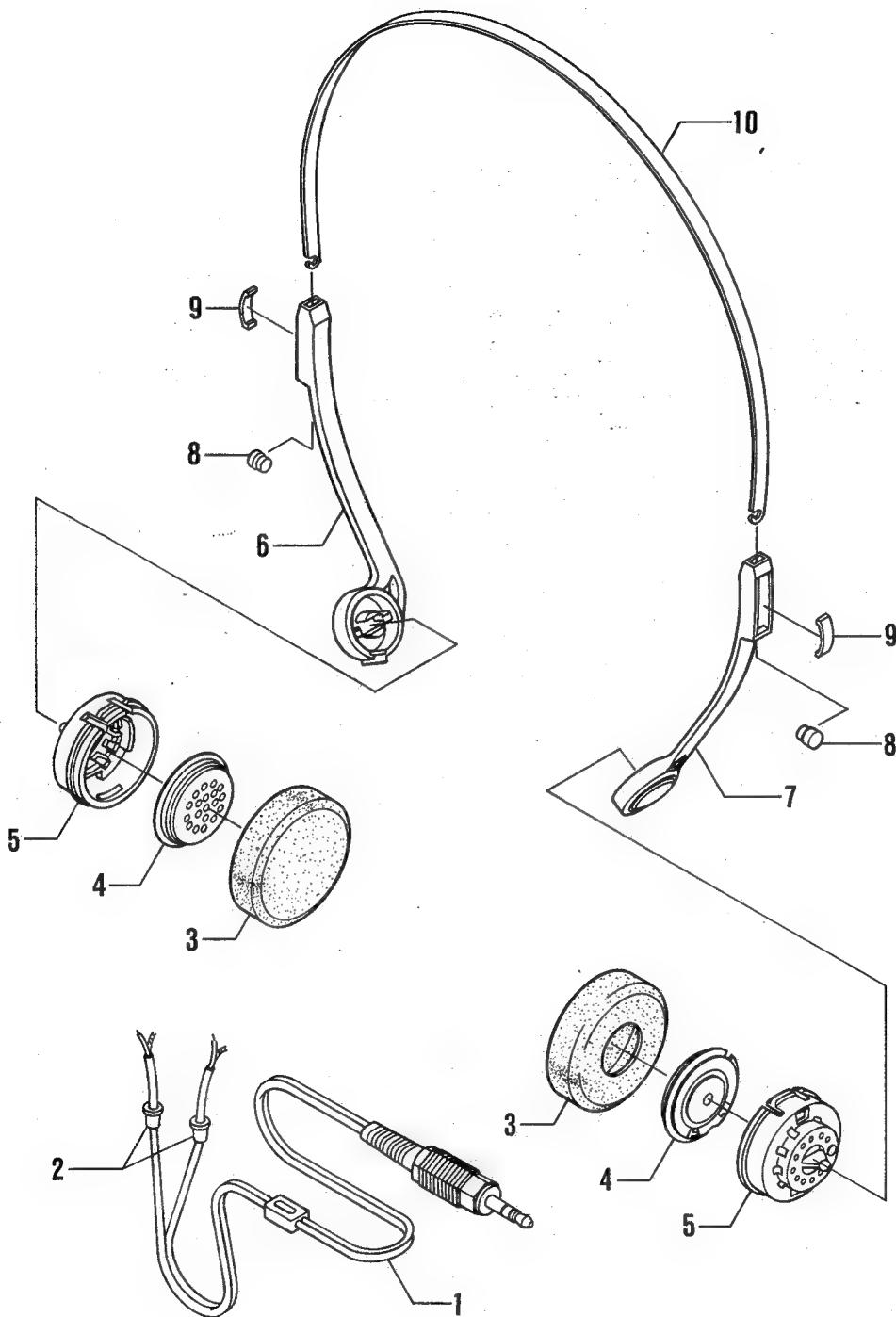
CABINET EXPLODED VIEW



RADIO CHASSIS EXPLODED VIEW



HEADPHONE EXPLODED VIEW



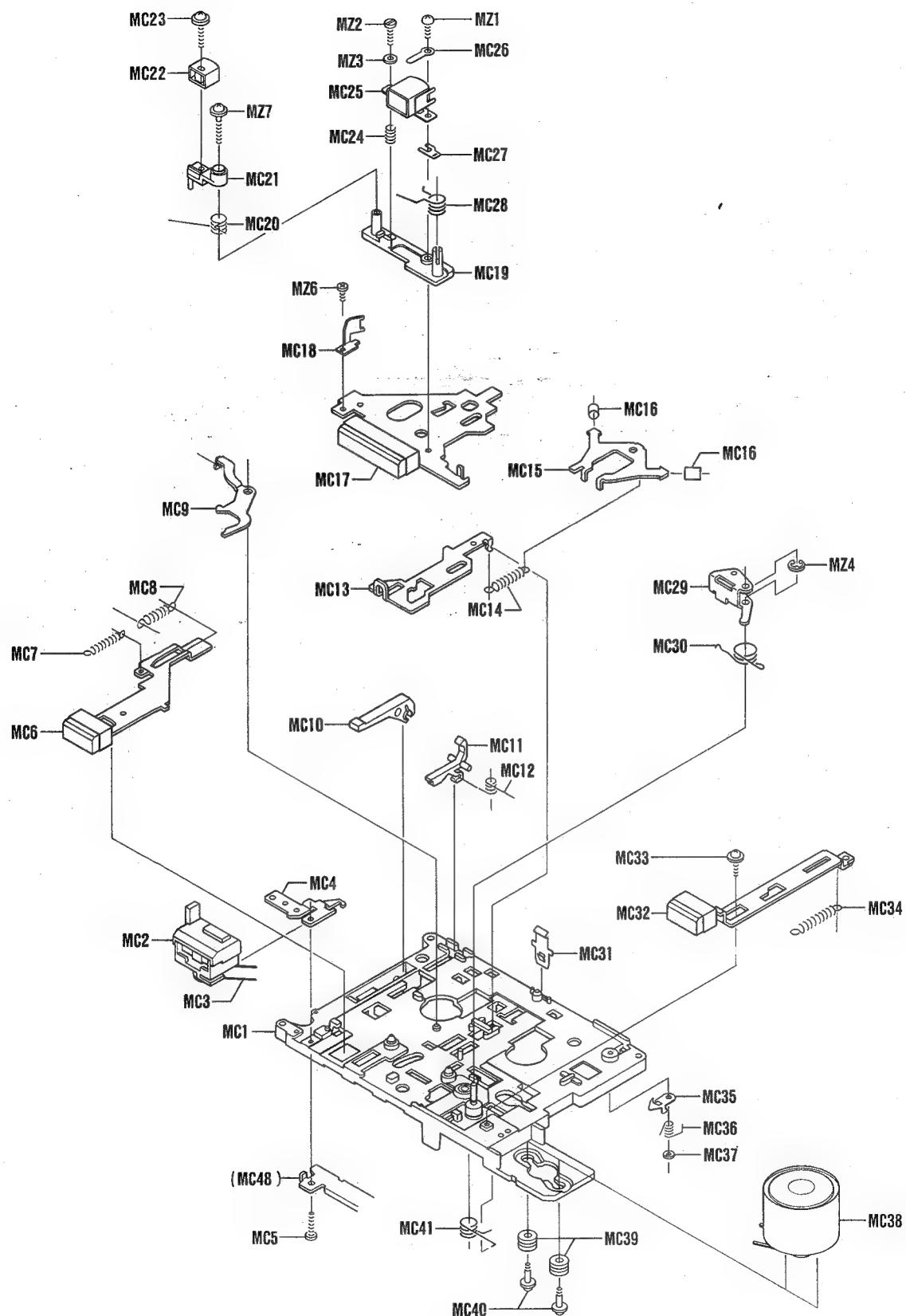
MECHANISM PARTS LIST

Ref. No.	Part No.	Description	Q'ty	Ref. No.	Part No.	Description	Q'ty
		MECHANISM					
MC1	141 0 3119 21300	Chassis Assy	1	MC64	141 2 8559 04300	Spring, Supply	1
MC2	141 2 8119 10800	Counter	1	MC65	141 0 5319 07100	Reel Supply Assy	1
MC3	141 2 5649 20200	Counter Belt	1	MC66	141 0 7439 11200	Rewind Arm Assy	1
MC4	141 2 8139 08800	Counter Bracket	1	MC67	141 2 5519 46100	Rewind Gear	1
MC5	141 2 4219 28100	Screw, Pan Hd.	1	MC68	141 2 7439 30400	Selector Link	1
MC6	141 0 7419 36002	Record Rod Assy	1	MC69	141 2 7439 30500	Fast Arm	1
MC7	141 2 8519 94300	Spring, Lock Plate	1	MC70	141 2 8549 18400	Spring, Fast Arm	1
MC8	141 2 8519 44100	Spring, Interlock	1	MC71	141 2 7419 81700	F.FWD. Lever	1
MC9	141 2 8419 11900	Record Lock Lever	1	MC72	141 2 8549 15200	Spring, F.FWD. Rewind Arm	1
MC10	141 2 7419 81800	Eject Lever	1	MC73	141 2 4539 09300	Washer	1
MC11	141 2 8419 11800	Interlock Lever	1	MC74	141 2 5519 46200	Fast Gear	1
MC12	141 2 8529 10800	Spring, Interloc	1	MC75	141 2 4539 30300	Washer	1
MC13	141 2 7419 82500	Play Rod	1	MC76	141 0 7419 35703	Stop Rod Assy	1
MC14	141 2 8519 61100	Spring, Slide	1	MC77	141 2 8549 16600	Spring, Eject Plate	1
MC15	141 2 7149 06101	Brake Arm	1	MC78	141 2 7319 54100	Eject Plate	1
MC16	141 2 4459 25200	Brake Cover	2	MC79	141 2 7319 54000	Lock Plate	1
MC17	141 0 7319 25603	Slide Base Assy	1	MC80	141 2 7419 81900	Cue Review Lever	1
MC18	141 2 8219 32000	Guide Tape	1	MC81	141 2 8429 06300	Record Plate	1
MC19	141 2 3529 36000	Spacer, Head	1	MC82	141 2 8519 84300	Spring, Flywheel Support	1
MC20	141 2 8529 10700	Spring, Erase Head Arm	1	MC83	141 2 8549 20800	Spring, Record Plate	1
MC21	141 2 7439 30600	Erase Head Arm	1	MC84	141 2 4539 06900	Washer	1
MC22	4 2429 72220	Erase Head	1	MC85	141 2 7319 53700	Take-up Arm	1
MC23	141 2 4219 28300	Screw w/Washer	1	MC86	141 2 8549 15300	Spring, Take-up Arm	1
MC24	141 2 8519 47400	Spring, Head	1	MZ1	101 3 1302 00511	Screw, Pan Hd.	+M2.0x5
MC25	4 2429 72210	R/P Head	1	MZ2	101 3 2502 00711	Screw, Cylinder Hd.	-M2.0x7
MC26	141 2 4729 01900	Lug	1	MZ3	110 3 1102 00023	Sm. Round Washer	M2.0
MC27	141 2 3529 18101	Spacer, Head	1	MZ4	112 3 1302 00082	E Ring	M2.0
MC28	141 2 8529 11100	Spring, Slide Base	1	MZ5	112 3 1302 50082	E Ring	M2.5
MC29	141 0 5459 01900	Pinch Roller Arm Assy	1	MZ6	127 3 1317 02013	PI Screw-1, Pan Hd.	+M1.7x2.0
MC30	141 2 8529 11200	Spring, Pinch Roller	1	MZ7	135 3 1302 01211	Screw, Pan Hd. C PW	+M2.0x12
MC31	141 2 8539 46800	Spring, Cassette	1	MZ8	143 3 1702 00618	Screw, Bind Hd. Tapping-B	+M2.0x6
MC32	141 0 7419 35903	Completed Pause Rod	1	MZ9	143 3 1202 01018	Screw, Flat Hd. Tapping-B	+M2.0x10
MC33	141 2 4219 13201	Screw w/Washer	1				
MC34	141 2 8549 16400	Spring, Pause Rod	1				
MC35	141 2 7419 84200	Pause Lock Lever	1				
MC36	141 2 8529 10600	Spring, Pause Latch	1				
MC37	141 2 4539 29600	Washer	1				
MC38	4 5279 71182	Motor	1				
MC39	141 2 4459 26800	Cushion, Motor	2				
MC40	141 2 4219 23300	Screw	2				
MC41	141 2 8529 11000	Spring, Play Rod	1				
MC42	141 2 4419 18200	Cushion	1				
MC43	141 2 7539 23900	Spacer, PCB	1				
MC44	141 2 5519 46400	Take-up Idler	1				
MC45	141 2 4539 15800	Washer	1				
MC46	141 0 7419 35803	Completed Rewind Rod	1				
MC47	141 0 7419 35603	Completed F.FWD. Rod	1				
MC48	141 2 3169 19700	Bracket Plate	1				
MC49	141 2 8519 33000	Spring, Index Lock Lever	1				
MC50	141 2 8549 16500	Spring, Stop/Eject Rod	1				
MC51	141 2 8549 19800	Spring, F.FWD Rewind Rod	2				
MC52	141 2 4539 21800	Washer	1				
MC53	141 2 5519 46000	Capstan Gear	1				
MC54	141 2 8559 03300	Spring, Flywheel	1				
MC55	141 0 5219 09000	Flywheel Assy	1				
MC56	141 2 5649 20300	Capstan Belt	1				
MC57	141 0 3129 01501	Reel Plate Assy	1				
MC58	141 2 8559 04600	Spring	1				
MC59	141 2 4539 02100	Washer	1				
MC60	141 2 7419 81600	Shut-off Lever	1				
MC61	141 2 8529 13000	Spring, ASO Cancel	1				
MC62	141 0 5319 07000	Take-up Reel Assy	1				
MC63	141 2 4539 28900	Spindle Washer	4				

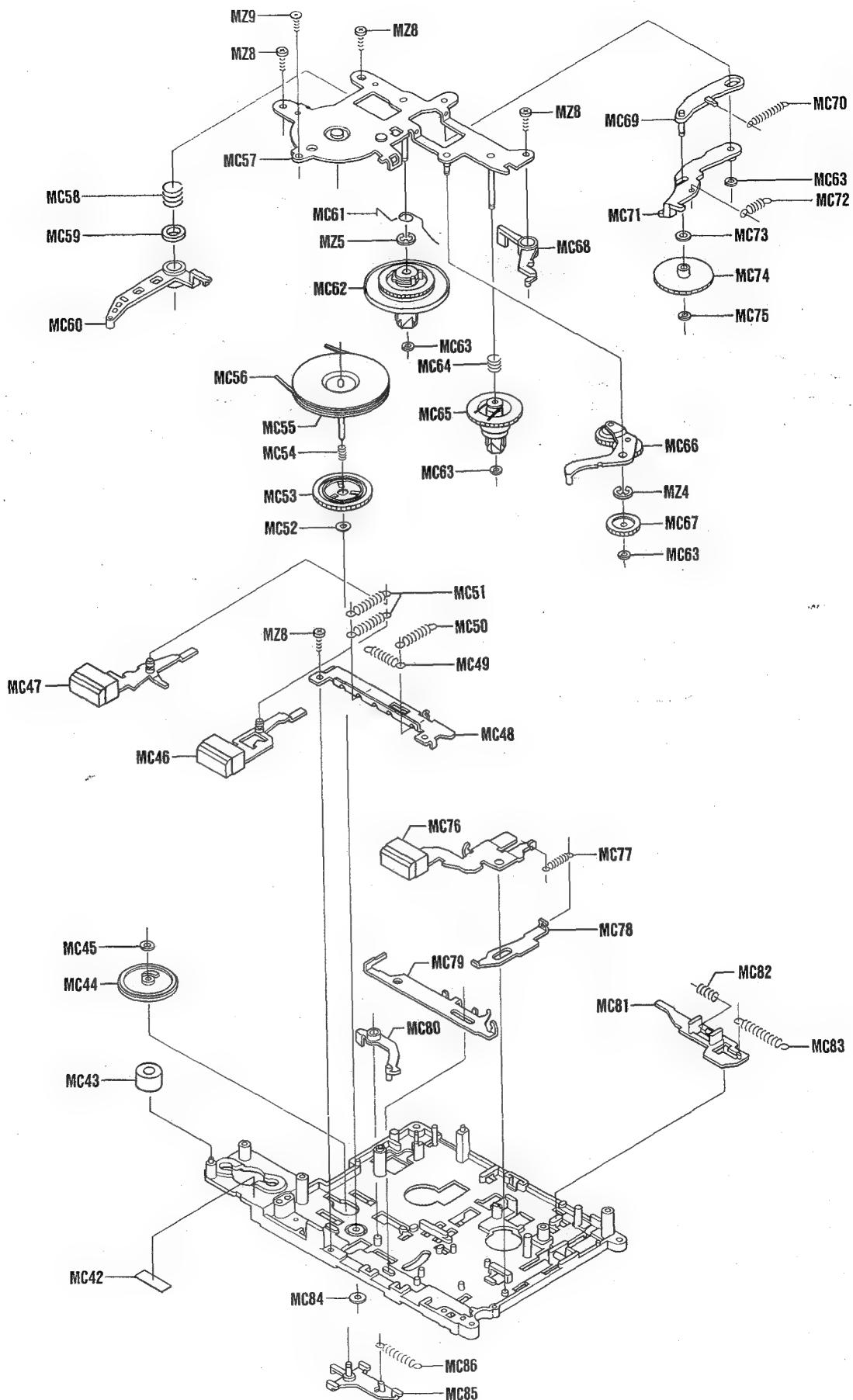
NOTES:

1. Parts order must contain Model Number, Part Number and Description.
2. Ordering quantity of screws and resistors must be multiple of 10 pcs.

MECHANISM EXPLODED VIEW



MECHANISM EXPLODED VIEW (Continued)



P.C.BOARD PARTS LIST

Ref. No.	Part No.	Description	Q'ty	Ref. No.	Part No.	Description	Q'ty
AMP/TUNER P.C.B. ASSY							
PCB1	4 1329 78219	AMP/Tuner P.C.B. Assy	1	D201	202 5 3160 00110	Diode, GMA-01	1
	4 2369 70742	RT Pin	4	D202	202 5 3160 00110	Diode, GMA-01	1
141	2 3229 39700	Shield Plate	1	D303	202 5 3160 00110	Diode, GMA-01	1
141	2 3229 39800	Shield Plate	1	D305	4 2029 71320	Diode, MA151WK	1
141	2 4359 30700	Insulator	1	D306	202 5 3160 00110	Diode, GMA-01	1
141	2 4359 31900	Spacer Plate	1	D307	202 5 3160 00110	Diode, GMA-01	1
CF1	4 2539 70881	Ceramic Filter	1	D308	202 5 3160 00110	Diode, GMA-01	1
CF2	4 2539 71191	Ceramic Filter	1	C1	CC8 0 A500 CD00C	Ceramic 8pF 50V ±0.2pF	1
PVC1	4 2249 70741	Variable Condenser	1	C2	CG1 0 3500 KH00B	Chip 0.01μF 50V ±10%	1
J1	4 2359 75500	1P Jack (Stereo Mike)	1	C3	CC1 0 0500 JD00C	Ceramic 18pF 50V ±5%	1
J2	4 2359 75500	1P Jack (Headphones)	1	C4	CG1 0 3500 KH00B	Chip 0.01μF 50V ±10%	1
J3	4 2359 72954	Ext. Power Jack	1	C5	CC2 0 0500 JCH0C	Ceramic 20pF 50V ±5%	1
S2	4 2319 75141	Slide Switch (Record/Play)	1	C6	CC5 0 A500 CD00C	Ceramic 5pF 50V ±0.2pF	1
S3	4 2319 75260	Slide Switch (Function)	1	C7	CC1 5 0500 JD00C	Ceramic 15pF 50V ±5%	1
S4	4 2319 75270	Slide Switch (Tape Select)	1	C8	CC1 0 3500 ZG00C	Ceramic 0.01μF 50V +80,-20%	1
S6	4 2319 73990	Leaf Switch (Power)	1	C9	CG1 0 3500 KH00B	Chip 0.01μF 50V ±10%	1
S7	4 2319 73991	Leaf Switch (Tape)	1	C10	CG1 0 2500 KH00B	Chip 0.001μF 50V ±10%	1
T1	4 2569 71331	FM DET, 10.7	1	C11	CG1 0 3500 KH00B	Chip 0.01μF 50V ±10%	1
T2	4 2569 71450	IFT, AM	1	C12	CG4 7 3250 MH00A	Chip 0.047μF 25V ±10%	1
T3	4 2569 71321	FM IFT, 10.7	1	C13	CD1 0 763A 0002V	Electrolytic 100μF 6.3V	1
T4	4 2589 71620	OSC Transformer, MW	1	C14	CD4 7 5250 0002V	Electrolytic 4.7μF 25V	1
T301	4 2589 72040	OSC Transformer	1	C15	4 2239 70791	Capacitor 10μF 16V	1
L1	4 2599 70740	RF Coil	1	C16	CG4 7 3250 MH00A	Chip 0.047μF 25V ±20%	1
L2	4 2589 72021	FM OSC Coil	1	C17	CG4 7 3250 MH00A	Chip 0.047μF 25V ±20%	1
L3	4 2539 71180	Trap 19kHz	1	C18	CG3 3 3250 MH00A	Chip 0.033μF 25V ±20%	1
L4	4 2539 71180	Trap 19kHz	1	C19	CD4 7 663A 0002V	Electrolytic 47μF 6.3V	1
L6	4 2539 71171	Band Pass Filter	1	C20	CD1 0 6160 0002V	Electrolytic 10μF 16V	1
L101	4 2539 71001	Choke Coil (8.2μH)	1	C21	CG3 3 3250 MH00A	Chip 0.033μF 25V ±20%	1
L102	4 2539 70991	Choke Coil (2.2μH)	1	C22	CD2 2 663A 0002V	Electrolytic 22μF 6.3V	1
L201	4 2539 71001	Choke Coil (8.2μH)	1	C23	CD4 7 5250 0002V	Electrolytic 4.7μF 25V	1
L202	4 2539 70991	Choke Coil (2.2μH)	1	C24	CD2 2 663A 0002V	Electrolytic 22μF 6.3V	1
L301	4 2539 70981	Choke Coil (10μH)	1	C25	CG3 3 3250 MH00A	Chip 0.033μF 25V ±20%	1
L302	4 2539 70650	Choke Coil (3.3μH)	1	C26	CT1 0 463A M00AV	Tantalume 0.1μF 6.3V ±20%	1
L303	4 2539 70650	Choke Coil (3.3μH)	1	C27	CG6 8 2500 KH00B	Chip 0.0068μF 50V ±10%	1
L304	4 2539 70740	Choke Coil (500μH)	1	C28	CG2 7 2500 KH00B	Chip 0.0027μF 50V ±10%	1
P1	4 2229 72995	Potentiometer (B-5kΩ)	1	C29	CG3 3 3250 MH00A	Chip 0.033μF 25V ±20%	1
P301	4 2229 72996	Potentiometer (B-10kΩ)	1	C30	CT1 0 463A M00AV	Tantalume 0.1μF 6.3V ±20%	1
TH301	204 5 9000 00090	Thermistor, SDT 09	1	C31	CG6 8 2500 KH00B	Chip 0.0068μF 50V ±10%	1
TH302	204 5 9000 01000	Thermistor, SDT 100	1	C32	CG2 7 2500 KH00B	Chip 0.0027μF 50V ±10%	1
IC1	4 2069 71510	IC, AN7216	1	C33	CD1 0 5500 0002V	Electrolytic 1μF 50V	1
IC2	4 2069 71530	IC, AN7223	1	C34	CD1 0 5500 0002V	Electrolytic 1μF 50V	1
IC3	206 5 0483 36161	IC, LA3361	1	C35	CT4 7 463A M00AV	Tantalume 0.47μF 6.3V ±20%	1
IC301	4 2069 71710	IC, M51544L	1	C36	CP1 0 2101 J002V	Polypropylene 0.001μF 100V ±5%	1
IC302	206 5 1634 19010	IC, LA4190	1	C37	CG3 3 3250 MH00A	Chip 0.033μF 25V ±20%	1
IC303	206 5 3285 52210	IC, LA5522	1	C38	CD1 0 763A 0001V	Electrolytic 100μF 6.3V	1
Q1	4 2039 70710	Transistor, 2SC2786	1	C39	CG3 3 3250 MH00A	Chip 0.033μF 25V ±20%	1
Q2	203 5 4392 99940	Transistor, 2SC 2999	1	C40	CI4 7 3120 ZF00C	Boundary 0.047μF 12V +80,-20%	1
Q101	203 5 5260 69362	Transistor, 2SC693	1	C41	4 2239 70520	Capacitor 220μF 6.3V	1
Q102	203 5 5210 53670	Transistor, 2SC 536	1	C42	CG2 2 3250 KH00B	Chip 0.022μF 25V ±10%	1
Q103	203 5 4451 04887	Transistor, 2SD 1048	1	C43	CC7 0 A500 CD00C	Ceramic 7pF 50V ±0.2pF	1
Q201	203 5 5260 69362	Transistor, 2SC693	1	C44	CG1 0 3500 KH00B	Chip 0.01μF 50V ±10%	1
Q202	203 5 5210 53670	Transistor, 2SC 536	1	C45	CG2 2 2500 KH00A	Chip 0.0022μF 50V ±10%	1
Q203	203 5 4451 04887	Transistor, 2SD 1048	1	C46	CC5 0 A500 CD00C	Ceramic 5pF 50V ±0.2pF	1
Q204	203 5 4451 04887	Transistor, 2SD 1048	1	C101	CT1 0 463A M00AV	Tantalume 0.1μF 6.3V ±20%	1
Q205	203 5 4401 17915	Transistor, 2SA 1179	1	C102	CG2 2 3250 KH00B	Chip 0.022μF 25V ±10%	1
Q301	203 5 4830 60860	Transistor, 2SA 608	1	C103	CG1 0 2500 KH00A	Chip 0.001μF 50V ±10%	1
Q302	203 5 4451 04887	Transistor, 2SD 1048	1	C104	CD3 3 5250 0002V	Electrolytic 3.3μF 25V	1
Q303	203 5 5210 53670	Transistor, 2SC 536	1	C105	CG1 0 2500 KH00B	Chip 0.001μF 50V ±10%	1
D1	205 5 9040 44210	Diode, DS 442	1	C106	CD4 7 4500 0002V	Electrolytic 0.47μF 50V	1
D3	202 5 3160 00110	Diode, GMA-01	1	C107	CD1 0 740A 0002V	Electrolytic 100μF 4V	1
D4	202 5 3160 00110	Diode, GMA-01	1	C108	CD1 0 5500 0002V	Electrolytic 1μF 50V	1
D101	202 5 3160 00110	Diode, GMA-01	1	C109	CG1 0 2500 KH00B	Chip 0.001μF 50V ±10%	1
				C110	CC1 0 2500 KE00C	Ceramic 0.001μF 50V ±10%	1
				C111	CG4 7 3250 MH00A	Chip 0.047μF 25V ±20%	1

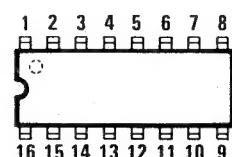
P.C.BOARD PARTS LIST (Continued)

Ref. No.	Part No.	Description	Q'ty	Ref. No.	Part No.	Description	Q'ty				
C112	CG1 2 2500 KH00B	Chip	0.0012μF	50V ±10%	1	C319	4 2239 70860	Capacitor	470μF	6.3V	1
C113	CG8 2 2500 KH00B	Chip	0.0082μF	50V ±10%	1	C320	CD2 2 663A 0002V	Electrolytic	22μF	6.3V	1
C114	CD4 7 4500 0002V	Electrolytic	0.47μF	50V	1	C321	CC3 3 2500 KE00C	Ceramic	0.0033μF	50V ±10%	1
C115	CD1 0 5500 0002V	Electrolytic	1μF	50V	1	C322	CD4 7 5250 0002V	Electrolytic	4.7μF	25V	1
C117	CD1 0 5500 0002V	Electrolytic	1μF	50V	1	C323	CI4 7 3120 ZFOOC	Boundary	0.047μF	12V +80,-20%	1
C118	CG1 5 2500 KH00B	Chip	0.0015μF	50V ±10%	1	C324	CI4 7 3120 ZFOOC	Boundary	0.047μF	12V +80,-20%	1
C119	CD4 7 640A 0002V	Electrolytic	47μF	4V	1	R1	RG3 3 4121 JA000	Chip	330kΩ	1/8W ±5%	1
C121	CD4 7 640A 0002V	Electrolytic	47μF	4V	1	R2	RP3 3 1121 JV000	Pretty Carbon	330Ω	1/8W ±5%	1
C122	4 2239 70880	Capacitor	1μF	16V	1	R4	RP1 0 1121 JV000	Pretty Carbon	100Ω	1/8W ±5%	1
C123	CD2 2 740A 0002V	Electrolytic	220μF	4V	1	R5	RP1 0 1121 JV000	Pretty Carbon	100Ω	1/8W ±5%	1
C124	CD1 0 5500 0002V	Electrolytic	1μF	50V	1	R6	RP3 9 3121 JV000	Pretty Carbon	39kΩ	1/8W ±5%	1
C125	CT2 2 563A M00AV	Tantalume	2.2μF	6.3V ±20%	1	R7	RG1 0 5121 JA000	Chip	1MΩ	1/8W ±5%	1
C126	CG1 8 2500 KH00B	Chip	0.0018μF	50V ±10%	1	R8	RP3 3 1121 JV000	Pretty Carbon	330Ω	1/8W ±5%	1
C127	CP3 9 2101 J001V	Polypropylene	0.0039μF	100V ±5%	1	R9	RP1 0 3121 JV000	Pretty Carbon	10kΩ	1/8W ±5%	1
C128	CG3 9 2500 KH00B	Chip	0.0039μF	50V ±10%	1	R11	RG3 3 2121 JA000	Chip	3.3kΩ	1/8W ±5%	1
C129	CD4 7 640A 0002V	Electrolytic	47μF	4V	1	R12	RG2 7 2121 JA000	Chip	2.7kΩ	1/8W ±5%	1
C130	CG2 2 3250 MH00A	Chip	0.022μF	25V ±20%	1	R13	RG6 8 2121 JA000	Chip	6.8kΩ	1/8W ±5%	1
C131	CG1 8 3500 KH00B	Chip	0.018μF	50V ±10%	1	R14	RG2 7 2121 JA000	Chip	2.7kΩ	1/8W ±5%	1
C201	CT1 0 463A M00AV	Tantalume	0.1μF	6.3V ±20%	1	R15	RG6 8 2121 JA000	Chip	6.8kΩ	1/8W ±5%	1
C202	CG2 2 3250 KH00B	Chip	0.022μF	25V ±10%	1	R16	RG3 6 1121 JA000	Chip	360Ω	1/8W ±5%	1
C203	CG1 0 2500 KH00B	Chip	0.001μF	50V ±10%	1	R17	RG1 0 2121 JA000	Chip	1kΩ	1/8W ±5%	1
C204	CD3 3 5250 0002V	Electrolytic	3.3μF	25V	1	R18	RG1 0 2121 JA000	Chip	1kΩ	1/8W ±5%	1
C205	CC1 0 2500 KE00C	Ceramic	0.001μF	50V ±10%	1	R19	RG9 1 2121 JA000	Chip	9.1kΩ	1/8W ±5%	1
C206	CD4 7 4500 0002V	Electrolytic	0.47μF	50V	1	R20	RG4 7 0121 JA000	Chip	47Ω	1/8W ±5%	1
C207	CD1 0 740A 0002V	Electrolytic	100μF	4V	1	R21	RG2 0 2121 JA000	Chip	22Ω	1/8W ±5%	1
C208	CD1 0 5500 0002V	Electrolytic	1μF	50V	1	R22	RP1 0 2121 JV000	Pretty Carbon	1kΩ	1/8W ±5%	1
C209	CG1 0 2500 KH00B	Chip	0.001μF	50V ±10%	1	R101	RP3 3 2121 JV000	Pretty Carbon	3.3kΩ	1/8W ±5%	1
C210	CC1 0 2500 KE00C	Ceramic	0.001μF	50V ±10%	1	R102	RG1 0 2121 JA000	Chip	1kΩ	1/8W ±5%	1
C211	CG4 7 3250 MH00A	Chip	0.047μF	25V ±20%	1	R103	RG3 9 2121 JA000	Chip	3.9kΩ	1/8W ±5%	1
C212	CG1 2 2500 KH00B	Chip	0.0012μF	50V ±10%	1	R104	RP4 7 4121 JV000	Pretty Carbon	470kΩ	1/8W ±5%	1
C213	CG8 2 2500 KH00B	Chip	0.0082μF	50V ±10%	1	R105	RP1 0 1121 JV000	Pretty Carbon	100Ω	1/8W ±5%	1
C214	CD4 7 4500 0002V	Electrolytic	0.47μF	50V	1	R106	RP3 9 2121 JV000	Pretty Carbon	3.9kΩ	1/8W ±5%	1
C215	CD1 0 5500 0002V	Electrolytic	1μF	50V	1	R107	RG1 0 1121 JA000	Chip	100Ω	1/8W ±5%	1
C217	CD1 0 5500 0002V	Electrolytic	1μF	50V	1	R108	RP4 7 3121 JV000	Pretty Carbon	47kΩ	1/8W ±5%	1
C218	CG1 5 2500 KH00B	Chip	0.0015μF	50V ±10%	1	R109	RP5 6 2121 JV000	Pretty Carbon	5.6kΩ	1/8W ±5%	1
C219	CD1 0 740A 0002V	Electrolytic	100μF	4V	1	R110	RP5 6 2121 JV000	Pretty Carbon	5.6kΩ	1/8W ±5%	1
C220	CD1 0 6160 0002V	Electrolytic	10μF	16V	1	R111	RP3 9 2121 JV000	Pretty Carbon	3.9kΩ	1/8W ±5%	1
C221	CD4 7 640A 0002V	Electrolytic	47μF	4V	1	R112	RP3 3 2121 JV000	Pretty Carbon	3.3kΩ	1/8W ±5%	1
C222	4 2239 70880	Capacitor	1μF	16V	1	R113	RG1 5 3121 JA000	Chip	15kΩ	1/8W ±5%	1
C223	CD2 2 740A 0002V	Electrolytic	220μF	4V	1	R114	RP5 6 2121 JV000	Pretty Carbon	5.6kΩ	1/8W ±5%	1
C224	CD1 0 5500 0002V	Electrolytic	1μF	50V	1	R115	RG1 5 2121 JA000	Chip	1.5kΩ	1/8W ±5%	1
C225	CT2 2 563A M00AV	Tantalume	2.2μF	6.3V ±20%	1	R116	RP1 0 4121 JV000	Pretty Carbon	100kΩ	1/8W ±5%	1
C226	CG1 8 2500 KH00B	Chip	0.0018μF	50V ±10%	1	R117	RP4 7 3121 JV000	Pretty Carbon	47kΩ	1/8W ±5%	1
C227	CP3 9 2101 J001V	Polypropylene	0.0039μF	100V ±5%	1	R118	RP4 7 2121 JV000	Pretty Carbon	4.7kΩ	1/8W ±5%	1
C228	CG3 9 2500 KH00B	Chip	0.0039μF	50V ±10%	1	R119	RG3 3 3121 JA000	Chip	33kΩ	1/8W ±5%	1
C231	CG1 8 3500 KH00B	Chip	0.018μF	50V ±10%	1	R120	RG3 9 2121 JA000	Chip	3.9kΩ	1/8W ±5%	1
C301	CG1 0 2500 KH00B	Chip	0.001μF	50V ±10%	1	R121	RG4 7 0121 JA000	Chip	47Ω	1/8W ±5%	1
C302	4 2239 70520	Capacitor	220μF	6.3V	1	R122	RG4 7 0121 JA000	Chip	47Ω	1/8W ±5%	1
C303	CD1 0 7100 0001V	Electrolytic	100μF	10V	1	R123	RG2 2 1121 JA000	Chip	220Ω	1/8W ±5%	1
C304	CD3 3 7100 0003V	Electrolytic	330μF	10V	1	R126	RP1 8 3121 JV000	Pretty Carbon	18kΩ	1/8W ±5%	1
C305	CD3 3 7100 0003V	Electrolytic	330μF	10V	1	R127	RP3 3 1121 JV000	Pretty Carbon	330Ω	1/8W ±5%	1
C306	4 2239 70840	Capacitor	220μF	16V	1	R128	RG8 2 3121 JA000	Chip	82kΩ	1/8W ±5%	1
C307	4 2239 70510	Capacitor	470μF	6.3V	1	R201	RP3 3 2121 JV000	Pretty Carbon	3.3kΩ	1/8W ±5%	1
C308	4 2239 70860	Capacitor	470μF	6.3V	1	R202	RG1 0 2121 JA000	Chip	1kΩ	1/8W ±5%	1
C309	CD4 7 663A 0002V	Electrolytic	47μF	6.3V	1	R203	RG3 9 2121 JA000	Chip	3.9kΩ	1/8W ±5%	1
C310	CG5 6 1500 JD00B	Chip	560pF	50V ±5%	1	R204	RG4 7 4121 JA000	Chip	470kΩ	1/8W ±5%	1
C311	CG8 2 1500 JD00B	Chip	820pF	50V ±5%	1	R205	RP1 0 1121 JV000	Pretty Carbon	100Ω	1/8W ±5%	1
C312	CG6 8 2500 KH00B	Chip	0.0068μF	50V ±10%	1	R206	RP3 9 2121 JV000	Pretty Carbon	3.9kΩ	1/8W ±5%	1
C313	CG1 0 3500 KH00B	Chip	0.01μF	50V ±10%	1	R207	RP1 0 1121 JV000	Pretty Carbon	100Ω	1/8W ±5%	1
C314	CD1 0 6160 0002V	Electrolytic	10μF	16V	1	R208	RP4 7 3121 JV000	Pretty Carbon	47kΩ	1/8W ±5%	1
C315	CD1 0 6160 0002V										

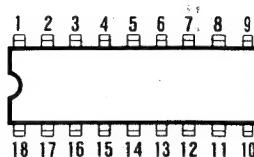
IC & TRANSISTOR LEAD IDENTIFICATION

TRANSISTOR	FRONT VIEW	BOTTOM VIEW
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2SA1179 2SD1048		
TERMINAL NAME		
B → BASE C → COLLECTOR E → EMITTER		

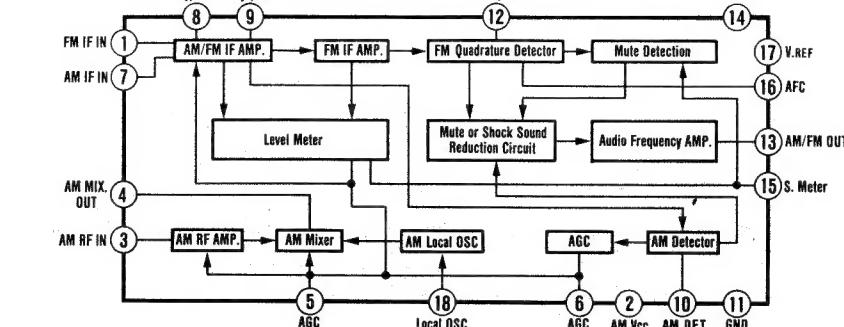
LA3361 BOTTOM VIEW



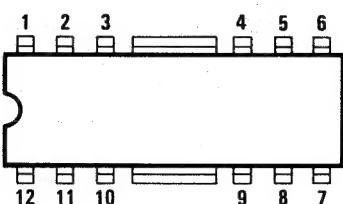
AN7223 BOTTOM VIEW



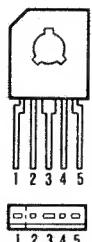
AN7223 BLOCK DIAGRAM



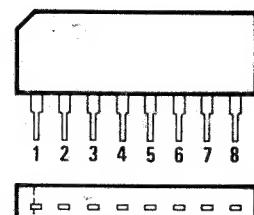
LA4190 BOTTOM VIEW



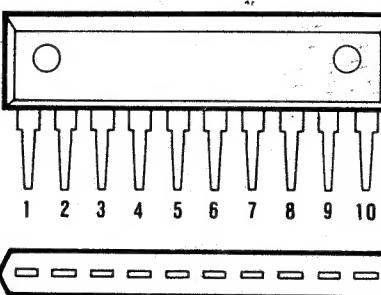
LA5522 FRONT VIEW



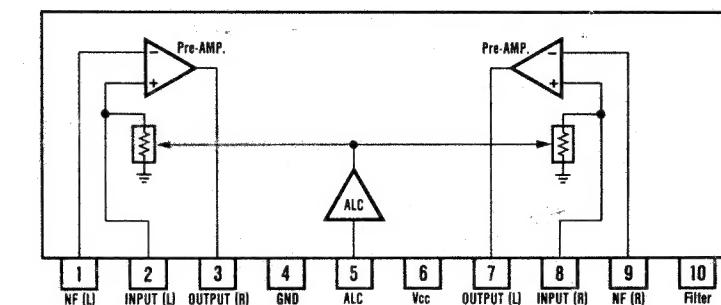
AN7216 FRONT VIEW



M51544L FRONT VIEW



M51544L BLOCK DIAGRAM

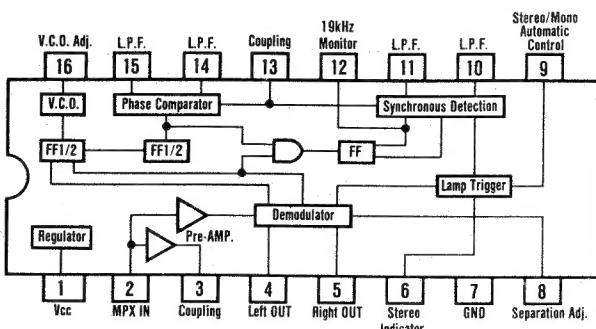


BOTTOM VIEW

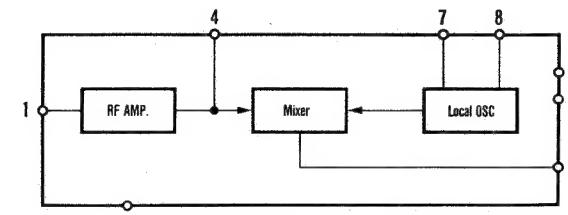
BOTTOM VIEW

BOTTOM VIEW

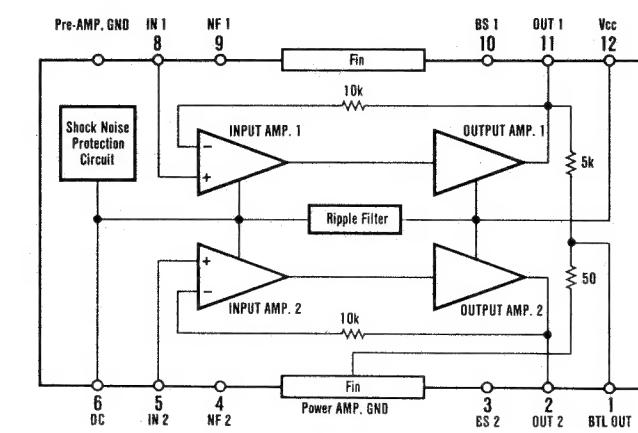
LA3361 BLOCK DIAGRAM



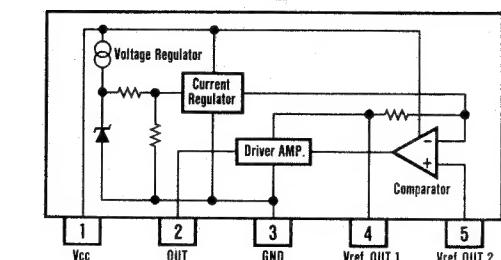
AN7216 BLOCK DIAGRAM



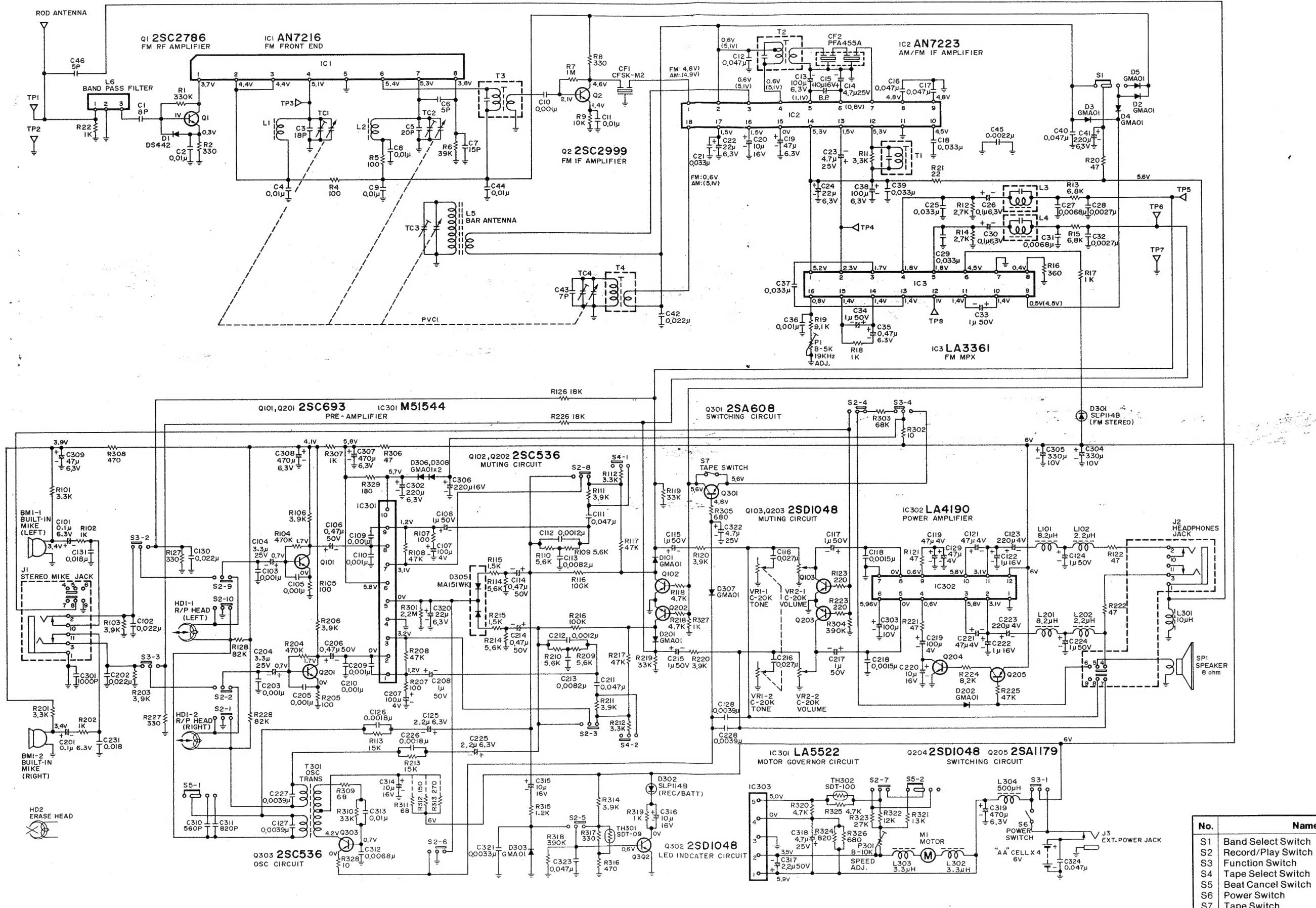
LA4190 BLOCK DIAGRAM



LA5522 BLOCK DIAGRAM

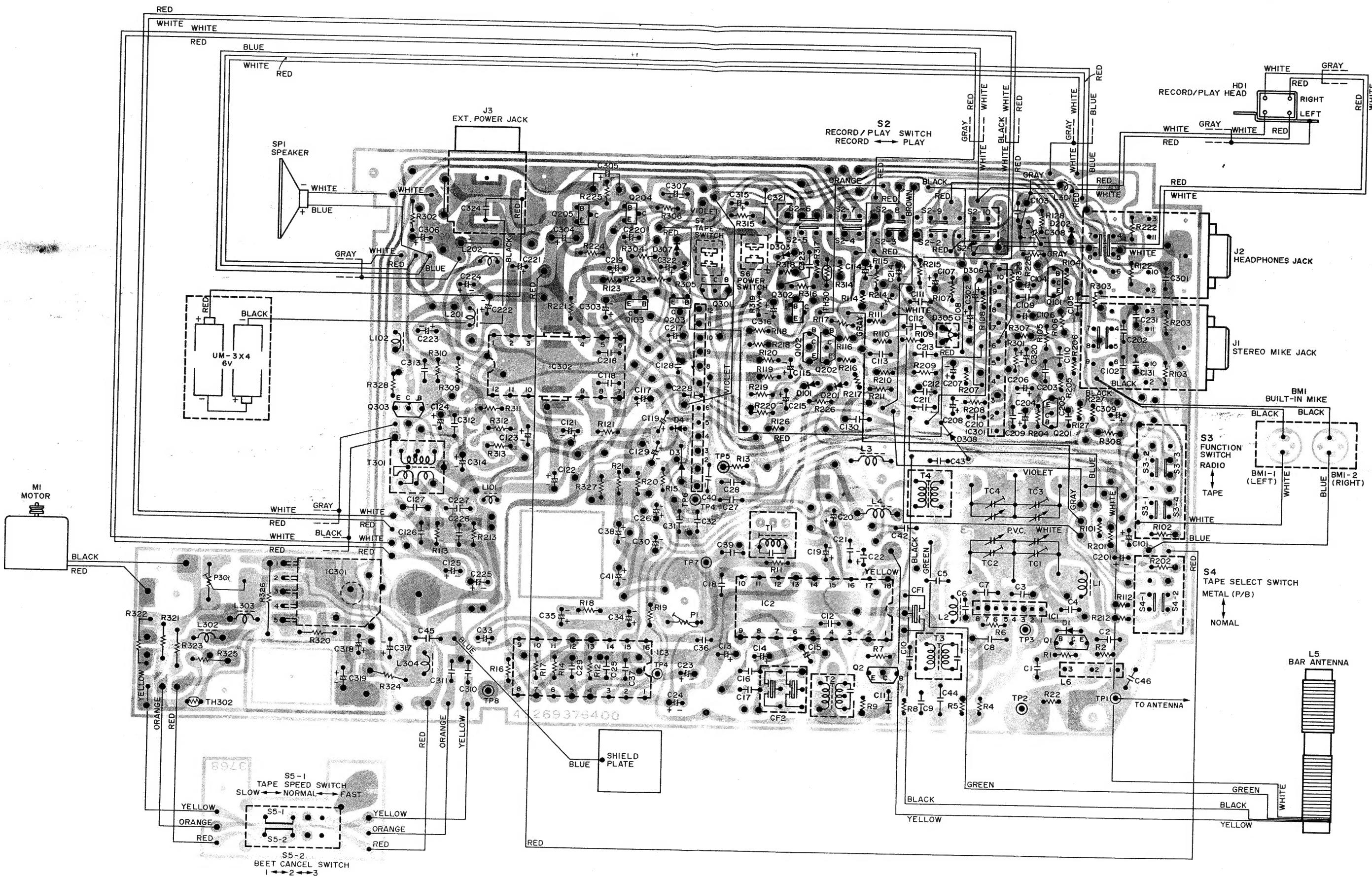


SCHEMATIC DIAGRAM



No.	Name	Position
S1	Band Select Switch	AM
S2	Record/Play Switch	PLAY
S3	Function Switch	TAPE
S4	Tape Select Switch	NORMAL
S5	Beat Cancel Switch	1
S6	Power Switch	OFF
S7	Tape Switch	OFF

AMPLIFIER/RADIO TUNER P.C.BOARD



VOLUME LED P.C.BOARD

